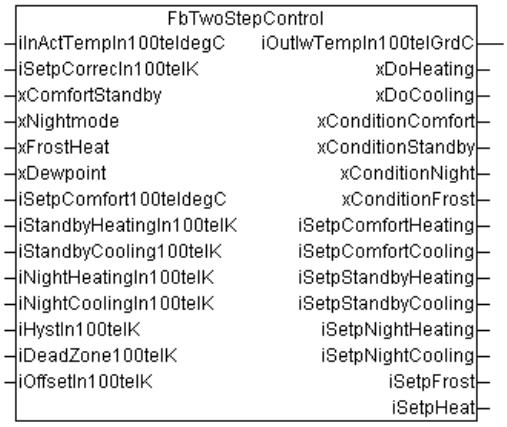
HeatingCoolingTwoStep

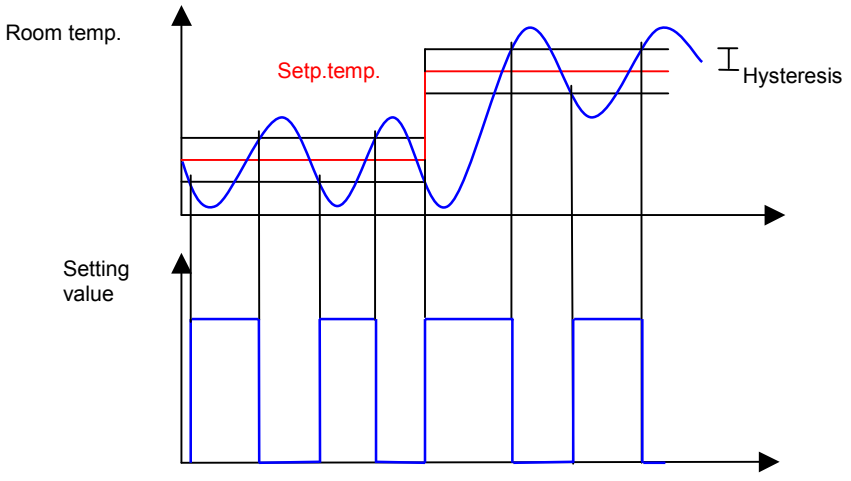
WAGO-I/O-*PRO* 32 Library elements			
Category:	Building automation		
Name:	FbTwoStepControl		
Type:	Function ☐	Function block ☒	Program ☐
Library name:	TwoStepControl.lib		
Applicable to:	All programmable fieldbus controllers		
Input parameter:	**Data type:**	**Comment:**	
iInActTempIn100teldegC	INTEGER	Measured value input for room temperature	
iSetpCorrectIn100telK	INTEGER	Setpoint value correction room temp. ± 3K	
xComfortStandby	BOOL	Selection of comfort/standby operating mode (1/0)	
xNightmode	BOOL	Polling of operating mode ‘night’	
xFrostHeat	BOOL	Polling of operating mode ‘frost/heat protection’	
xDewpoint	BOOL	Polling of operating mode ‘dew point alarm’	
iSetpComfortIn100teldegC	INTEGER	Basic set point value ‘comfort mode’ Value range: 0 – 5000 [0,01^{0}C] Default setting = 2100	
iStandbyHeatingIn100telK	INTEGER	Temp. decrease standby Value range: 0 – 2000 [0,01^{0}C] Default setting = 200	
iStandbyCoolingIn100telK	INTEGER	Temp. increase standby Value range: 0 – 2000 [0,01^{0}C] Default setting = 200	
iNightHeatingIn100telK	INTEGER	Temp. decrease night Value range: 0 – 2000 [0,01^{0}C] Default setting = 400	
iNightCoolingIn100telK	INTEGER	Temp. increase night Value range: 0 – 2000 [0,01^{0}C] Default setting = 400	
iHystIn100telK	INTEGER	Deviation from set point value Value range: 10 – 1000 [0,01^{0}C] Default setting = 30	
iDeadzoneIn100telK	INTEGER	Dead zone between heating and cooling Value range: 10 – 1000 [0,01^{0}C] Default setting = 200	
iOffsetIn100telK	INTEGER	Measured value compensation for room temperature input Value range: 0 – 1000 [0,01^{0}C] Default setting = 0	

Feedback value:	Data type:	Comment:
iOutIwTempIn100teldegC	INTEGER	Output of current room temperature
xDoHeating	BOOL	Switching signal for heating valve
xDoCooling	BOOL	Switching signal for cooling valve
xConditionComfort	BOOL	Display of comfort operating mode
xConditionStandby	BOOL	Display of standby operating mode
xConditionNight	BOOL	Display of night operating mode
xConditionFrost	BOOL	Display of frost operating mode
iSetpComfortHeating	INTEGER	Outp.of current setp.value ‘comfort heating’
iSetpComfortCooling	INTEGER	Outp.of current setp.value ‘comfort cooling’
iSetpStandbyHeating	INTEGER	Outp.of current setp.val.‘standby heating’
iSetpStandbyCooling	INTEGER	Outp.of current setp.val.‘standby cooling’
iSetpNightHeating	INTEGER	Outp.of current setp.val.‘night heating’
iSetpNightCooling	INTEGER	Outp.of current setp.val.‘night cooling’
iSetpFrost	INTEGER	Output of set point value ‘frost protection’
iSetpHeat	INTEGER	Output of set point value ‘heat protection’

Graphical display:



Time referenced behavior:

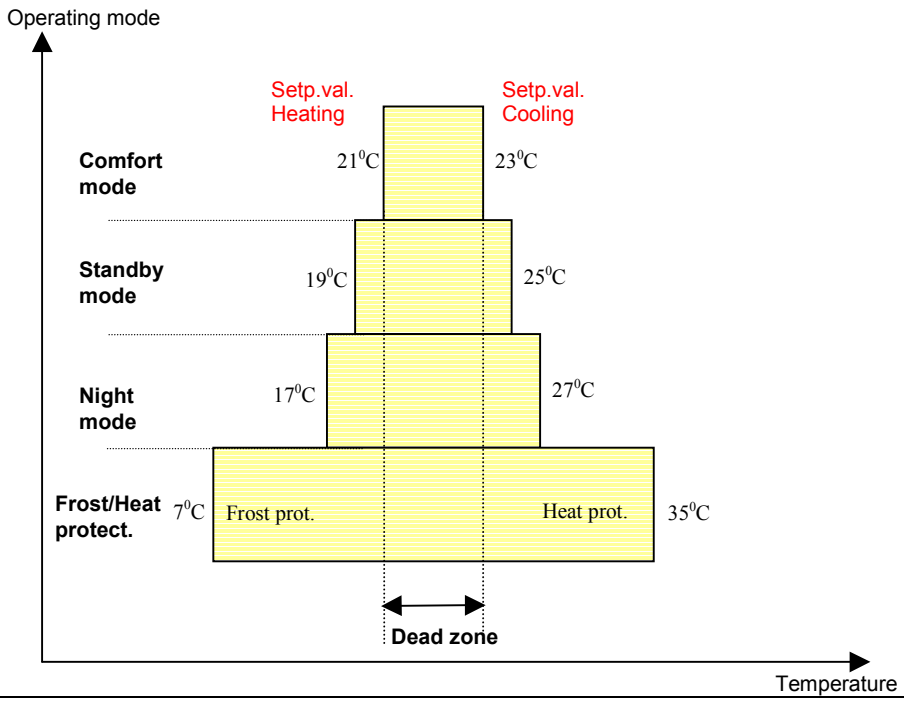


Function description:

The function block heating / cooling allows an individual room reference temperature control while taking local influences into account. The function block can be used for heating and cooling. It compares the measured temperature value ***"iInActTempIn100teldegC"*** (actual value) with the desired heating and cooling set point values. It sends the corresponding switching telegrams for heating ***("xDoHeating"***) and cooling ***("xDoCooling"***) by means of BOOL type output signals. The controller detects four operating modes (conditions) to each of which is assigned its own set point value. The ***"iSetpComfort100teldegC"*** is used as a set point value. All other set point values refer to the basic set point value and provoke each a set point value increase or set point value decrease by a parameterized value. Th basic set point value can be infinitely shifted by ± 3 K via the ***"iSetpCorrectIn100telK"*** input. The active operating mode (comfort, standby, night, frost protection, dew point alarm) is determined via the communication objects ***("xComfortStandby", "xNightmode", "xFrostHeat", "xDewpoint"***). The currently selected operating mode is viasualized ***via "xConditionComfort", "xConditionStandby", "xConditionNight", "xConditionFrost"***. A dead zone ***("iDeadZoneIn100telK"***) has to be parameterized between the operating modes heating and cooling. The selected size of this dead zone must not be too small in order to avoid a permanent switch-over between heating and cooling. The room temperature measured and, if applicable, compensated with the ***"iOffsetIn100telK"*** parameter can be sent via the output object ***"iOutIwTempIn100teldegC"***.

The max. deviation in relation to the set point temperature is entered as a default value via parameter ***" iHystIn100telK"***. A small hysteresis provokes a frequent switching of the valve voltage, but small set point value differences. A large hysteresis causes large deviations from the set point value, but leads to rare switching. If the function module is used for cooling purposes, another input object is required. The name of this object is ***"xDewpoint"***. If a dew point alarm is signalled on this object, the cooling / heating system switches off immediately.

The function module has eight monitor outputs: ***"iSetpComfortHeating", "iSetpComfortCooling "iSetpStandbyHeating", "iSetpStandbyCooling", "iSetpNightHeating", "SetpNightCooling", "iSetpFrost" and "iSetpHeat"***. The current set point values of the individual operating modes are put out via these outputs.



Operating mode	Setpoint value Heating	Setpoint value Cooling
Comfort mode	**Basic setpoint value 21 ^{0}C**	Basic set point value +dead zone 2 K
Standby mode	Basic set point value - Lowering, standby mode	Basic set point value +dead zone +raising, standby mode
Night mode	Basic set point value - Lowering, night mode	Basic set point value +dead zone +raising, night mode
Frost/heat protection	Set point value, frost protection 7 ^{0}C	Set point value, heat protection 35 ^{0}C
Dew point alarm	Setting value 0 (heating off)	Setting value 0 (cooling off)

Note:
This function block uses some residual variables having a **VAR_RETAIN** declaration.